



Preface to the special issue in honor of Professor V. A. Yurko



V.A. Yurko was born on 28 August 1949 in Ozinki, Saratov district, Russia. In 1971 he received his University Diploma in mathematics from Saratov State University (Department of Mathematics and Mechanics). In 1971-1974 he was a post-graduate student of the same department. In 1975 V.A. Yurko received the Kandidat of Sciences degree (Ph.D.) from Saratov State University. He was an assistant professor of mathematics in Saratov Polytechnical Institute (1974-1977) and an associate professor (docent) of the Department of Mathematics and Mechanics in Saratov State University (1977-1991). In 1992 he received the Doctor of Sciences degree from Moscow State University. Since 1991 he is a full professor of mathematics of the De-

partment of Mathematics and Mechanics in Saratov State University, and the Head of the Chair of Mathematical Physics and Numerical Analysis.

Research interests of Prof. Yurko include spectral theory, theory of differential & integral equations, mathematical physics, inverse problems. The first thesis of V.A. Yurko (for the Kandidat of Science degree, 1975) was devoted to uniqueness theorems of recovering parameters of differential operators with desirable spectral properties. The method developed in this work made it possible to describe the uniqueness classes for arbitrary order differential operators on a finite interval.

The second thesis of V.A. Yurko (for the Doctor of Science degree, 1992) titled "Inverse Problems for Differential Operators" was defended in Moscow State University. Inverse problems of spectral analysis which consist in recovering operators from their spectral characteristics are of high interest to many researchers due to the fundamental role that inverse problems play in various areas of mathematics, natural sciences, and engineering. At the same time the nonlinearity of many important classes of inverse problems makes them an extremely difficult area of research. That is why by the end of the 1980s more or less complete results have been received only for Sturm-Liouville and Dirac differential operators. In a major part of his works, Prof. Yurko has constructed the inverse problem theory for arbitrary order differential

operators and systems for regular and singular cases. He has developed a new approach that allowed him to give the complete solution of these classes of inverse spectral problems, obtain necessary and sufficient conditions for their solvability, create numerical algorithms, and study stability properties of the solutions. Nowadays his main method (called the method of spectral mappings) is the most universal tool for studying inverse spectral problems for various classes of operators.

The important part of Prof. Yurko's works is devoted to the so-called incomplete inverse problems that arise when only a part of spectral information is available. He has suggested a new method (called the method of standard models) for constructing solutions of a wide class of incomplete inverse problems, gave their classification, and described the degenerate cases.

For differential operators on the half-line the most difficult case for research is when the coefficients of the differential equation grow at infinity. In part of his works devoted to these classes of operators, V.A. Yurko introduced a new class of spectral characteristics in a special space of distributions and gave the solution of the inverse problem for higher-order differential operators on the half-line with locally integrable coefficients.

V.A. Yurko has also produced important results in the theory of boundary value problems for differential equations with singularities and turning points, in the theory of non-local inverse problems, in the theory of the so-called discontinuous boundary value problems, spectral theory of differential operators on spatial networks and other major areas of the theory of differential and integral equations and spectral theory.

An important part of Prof. Yurko's works is devoted to the applications of spectral theory in natural sciences and engineering. In particular, he has publications in elasticity theory, solid mechanics, electronics, astrophysics, and theory of nonlinear waves.

In total, V.A. Yurko has published more than 500 research articles and 9 monographs. He has received over 60 research grants from various international and Russian funds.